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Waterless Urinals and Garbage Disposal Systems: Two Examples of Institutional Water Efficiency

An Analysis of Water Use at the Presidio of Monterey

By

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The Presidio of Monterey (POM)

- Located on the Monterey Peninsula of California
- Home of the Defense Language Institute
  - Institutional setting
- Within the Monterey Peninsula Water Management District (MPWMD)
  - POM follows local regulations regarding water conservation

Water Conservation & Water Credits

- 1995 – California State Water Resources Control Board ordered a reduction of water withdrawals from the Carmel River
- MPWMD enacted conservation ordinances requiring water credits from retrofit or demolition prior to new construction
- POM 1985 Master Plan
  - Detailed sequence of facility construction and demolition
  - Scheduled according to congressional funding

Water Conservation Efforts at the POM

1998 to 2002: installed about 700 low-flow showerheads

1998: installed new irrigation system at Soldier's Field

March 2000: issued Commandant's water use policy

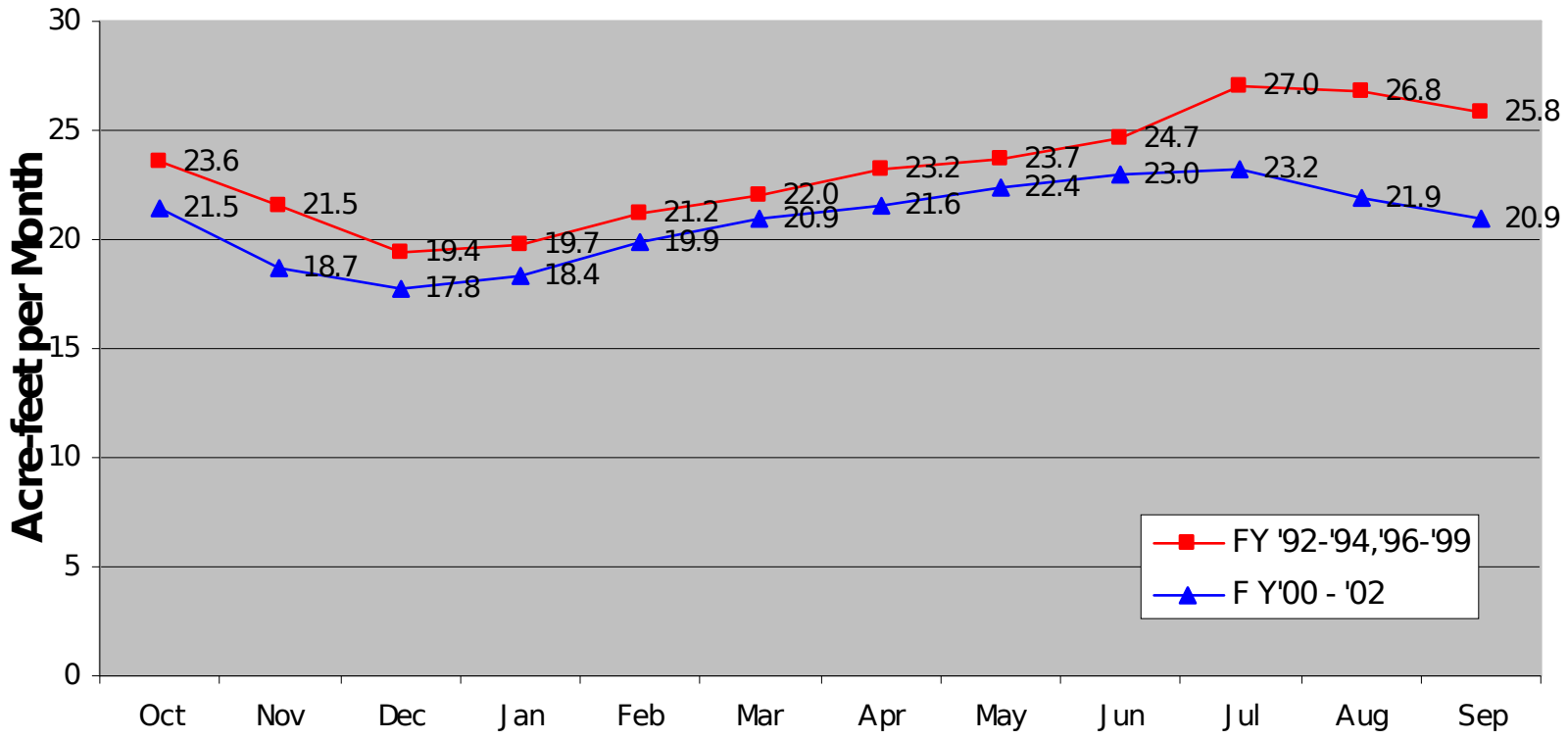
May 2000: installed new irrigation system at Hill Top athletic field

August 2000: installed water-efficient garbage disposal systems (SOMAT) in two dining facilities

December 2001 to March 2002: installed 173 waterless urinals in offices, classrooms and recreational facilities

2002: removed irrigation systems around barracks that were prone to leaks and maintenance problems

Monthly Average Water Use
Pre- and Post-Conservation



Summary of Estimated Savings

	Percent Savings	Monthly Savings AF/month	Annual Savings AF/year
Comparison of Monthly Use	10.4%[1]	2.38	28.56
Comparison of Winter Use (October - May)	7.6%[2]	1.65	19.8
Comparison of Summer Use (June - Sept)	14.7%[3]	3.82	n/a
Regression Analysis Conservation Coefficient	8.95%	2.06	24.681
Estimated Savings for Urinals & SOMATs	6.4%[1]	1.46	17.53

[1]Assumes pre-conservation use of 22.98 AF per month, or 275.76 AF per year.

[2]Based on pre-conservation winter use of 21.8 AF/month.

[3]Based on pre-conservation summer use of 26.1 AF/month.

SOMAT Waste Disposal Systems

- **Estimated savings of 0.706 acre-feet per month**

Waterless Urinals

- **Estimated savings of 0.755 acre-feet per month**

Previous Garbage Disposal Systems

- Dining facilities in two buildings
- Each dining area has garbage disposal system
- Continuous flow of water during operation
- Scraping trough used 6 gallons per minute
- Disposal used 5 gallons per minute

Previous Garbage Disposal System Water Use

11 gallons per minute per building

X 7 hours per day

= 4,620 gallons per day per building

X 365 days per year

X 2 buildings

= 3.37 million gallons per year

= 10.35 acre-feet per year

SOMAT Waste Disposal System

SOMAT System Water Use

Two troughs and two pulpers linked to one extractor per building

X 2 gallons per minute per pulper

X 3.5 hours per day

= 840 gallons per day per building

X 365 days per year

= 0.61 million gallons per year

= 1.88 acre-feet per year

SOMAT Water Savings

- 7,560 gallons per day
- 2.76 million gallons per year
- 8.47 acre-feet per year

- Also:
  - Reduced labor time 50%
  - Reduced waste disposal

Waterless Urinals

- Retrofit of 173 urinals in 48 buildings
  - Non-housing facilities
- Previous study of fixtures at the POM:
  - Identified number and flush rate of fixtures by building
  - 209 urinals in non-housing facilities
  - Range: 1.0 to 3.0 gallons per flush
  - Average: 1.74 gallons per flush

Frequency of Urinal Use

4,300 persons

X 66% male

X Assume one restroom visit every 2 hours

X Assume 50% of visits are urinal use

= 709.5 urinal flushes per hour

= 3.39 flushes per hour per urinal

Calculation of Urinal Water Savings

3.39 flushes per urinal per hour

X Hours of operation per building

X Number of urinals replaced per building

X Prior flush volume per building

= Average gallons saved per day per building

X Annual number of days of operation per building

= Annual water savings

Waterless Urinal Water Savings

- 11,490 gallons per day
- 2.98 million gallons per year
- 9.06 acre-feet per year

- Also:
  - No significant change in custodial labor after initial training
  - Modification of maintenance schedule

Conclusions

- Water conservation efforts at the POM since March 2000 have saved an estimated 1.65 acre-feet per month in indoor water use
- SOMAT systems save 0.706 acre-feet per month
- Waterless urinals save 0.755 acre-feet per month